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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/172,553	10/14/1998	JAMES E. GREEN	2914.IUS	9441

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EXAMINER	
DIAZ, JOSE R	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/172,553	GREEN ET AL.	
	Examiner	Art Unit	
	José R. Díaz	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *31-35 and 37-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *31-35 and 37-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 37-41 and 44-45 are still rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The claimed structure comprising a HSG polysilicon layer on the storage poly and a dielectric material is not supported by Applicant's Specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

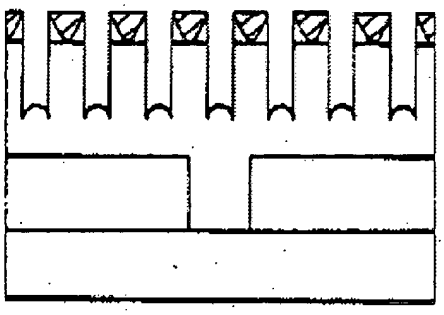
Claim 31-35 and 37-45 are still rejected under 35 U.S.C. 102(b) as being anticipated by Jun et al. (US Patent No. 5,256,587).

Regarding claims 31-32, 35 and 43, Jun et al. teaches an intermediate semiconductor capacitor structure (see figure 4c) comprising: a storage poly structure

(13) comprising a plurality of contiguous mesas (consider the fingers or columns that include mask 15 and HSG 14 in fig 4c) with recess formed therein (consider the space between the fingers or columns in fig. 4c); a contiguous hemispherical-grain polysilicon (14) over said storage poly structure (13) (see fig. 4c) and a mask (15) over said hemispherical-grain polysilicon layer (14), said recesses (consider the space between the fingers or columns) being exposed through said contiguous hemispherical-grain polysilicon (14) and said mask (15) (see figure 4c).

With regards to the terms "contiguous mesas" or "contiguous webs", please refer to figures 4c and 6c, below. Please note that figure 4c shows shallow recesses that do not disturb the continuity of the storage poly structure 13. Thus, figure 4c shows storage poly fingers connected throughout in an unbroken sequence.

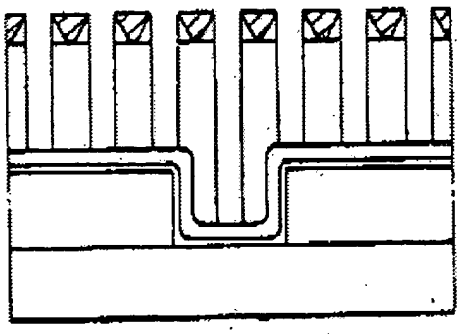
F I G . 4c



By the contrary, figure 6C shows deep recesses that disturb the continuity of the fingers. Thus, in this case figure 6c does not show contiguous fingers. Therefore, the terms "contiguous mesas" or "contiguous webs" in view of Jun et al. will be define according to

figure 4c, in which shallow recesses are provided without disturbing the continuity of the storage poly.

F I G . 6c



Regarding claims 33-34, 37 and 44-45, Jun et al. teaches an intermediate semiconductor capacitor structure (see fig. 4d) comprising: a storage poly structure (13) (see fig. 4d); a plurality of low contiguous elevation regions of a hemispherical-grain polysilicon (14) on said storage poly structure (13) (see fig. 4d); recesses (consider the spaces between fingers or columns that are filled with layers 16 and 17) formed in said storage poly structure and located laterally between said low elevation regions of said hemispherical-grain polysilicon layer (14) (see fig. 4d); and a dielectric material (16) at least lining the recesses (see figure 4c).

Regarding claim 38, Jun et al. teaches an intermediate semiconductor capacitor structure (see figure 4d) comprising: a storage poly structure (13) (see fig. 4d); low elevation regions of a hemispherical-grain polysilicon (14) on said storage poly structure (13) (see fig. 4d); recesses (consider the spaces between fingers or columns that are filled with layers 16 and 17) formed in said storage poly structure (13) and located

laterally between said low elevation regions of said hemispherical-grain polysilicon layer (14) (see figure 4d); and a dielectric material (16) substantially coating an upper surface of said storage poly structure (see top surface of the fingers or columns on which 14 is provided) (see fig. 4d) and lining each of said plurality of recesses (see figure 4d).

Regarding claim 39, Jun et al. teaches a cell poly structure (17) over the dielectric layer (16) (see figure 4d).

Regarding claim 40, Jun et al. teaches a web-like structure (consider the fingers or columns that include HSG 14 in fig 4c) comprising a plurality of contiguous top surfaces (please note that each finger or column includes at least two contiguous HSG triangles 14) (see fig. 4d).

Regarding claim 41, Jun et al. teaches that the recesses (consider the spaces between fingers or columns that are filled with layers 16 and 17) extend into said poly structure (13) (see fig. 4d).

Regarding claim 42, Jun et al. teaches an intermediate semiconductor capacitor structure (see fig. 4b) comprising: a storage poly structure (13) (see figure 4b); a substantially confluent HSG polysilicon layer (14) on said storage poly structure (13) (see figure 4b); and a mask (15) over said substantially confluent HSG polysilicon layer (14) (see figure 4b), elevated portions (top portion of the triangle) of said HSG polysilicon layer (14) being exposed through said mask (15) (see fig. 4b).

Response to Arguments

Regarding claims 31-35, 37-45, Applicant's arguments filed June 2, 2004 have been fully considered but they are not persuasive.

35 U.S.C. 112, first paragraph

The specification does not disclose that a portion of the HSG polysilicon layer may remain covered by the mask such that some of the HSG layer will necessarily remain after the etch stop. For example, the HSG polysilicon layer (130) shown in figure 7 is completely removed from the substrate shown in figure 9 and prior to the deposition of the dielectric layer (138) shown in figure 10. Thus, Applicant has not provided any evidence that the disclosed process always necessarily results in some HSG remaining. Applicant is reminded that a showing of obviousness --as opposed to inherency-- does not overcome a 112-first paragraph new-matter rejection.

35 U.S.C. 102(b)

Applicant also argues that Jun does not teach "a plurality of contiguous mesas" or "HSG having a web-like appearance." However, the examiner disagrees. On page 6 of remarks filed on October 16, 2001, Applicant defined the term "contiguous mesas" as "structures that touch one another, that share a boundary, or that are connected without a break therebetween", and on page 8 of remarks filed February 23, 2004, Applicant further defined the terms "mesas" and "webs" as top surfaces of the storage poly. Based

on these definitions, the examiner interpreted the terms "contiguous mesas" and "contiguous webs" as follow:

First Interpretation

A mesa or web defined as a mere portion or region of a top surface. For example, the mesas or webs (fingers 9a-9c in figure 22, below) are "contiguous" because they share the same top surface (9).

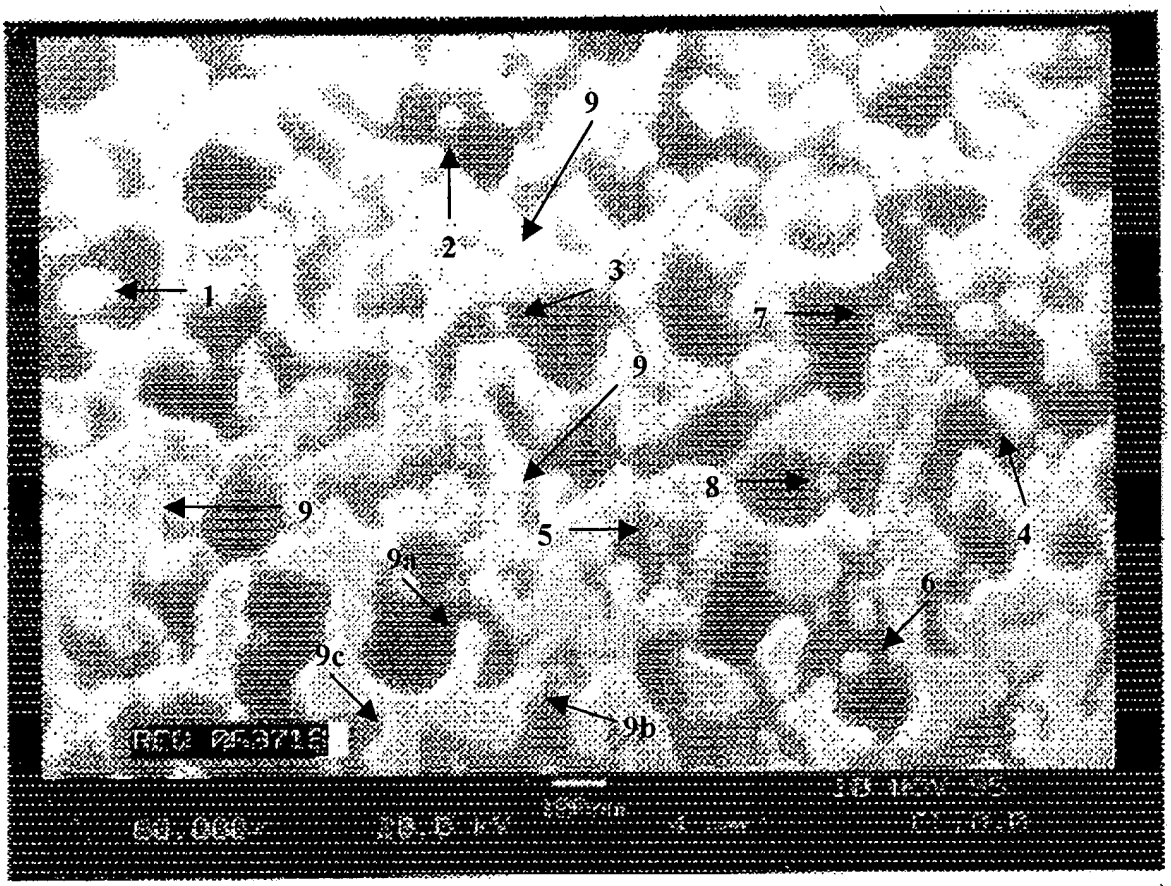


Fig. 22

Second Interpretation

The mesas or webs are contiguous by sharing the same base. For example, top surfaces A1 and A2 share base (B1); and A2 and A3 share base (B2), which is adjacent to base (B1) (see fig 9, below).

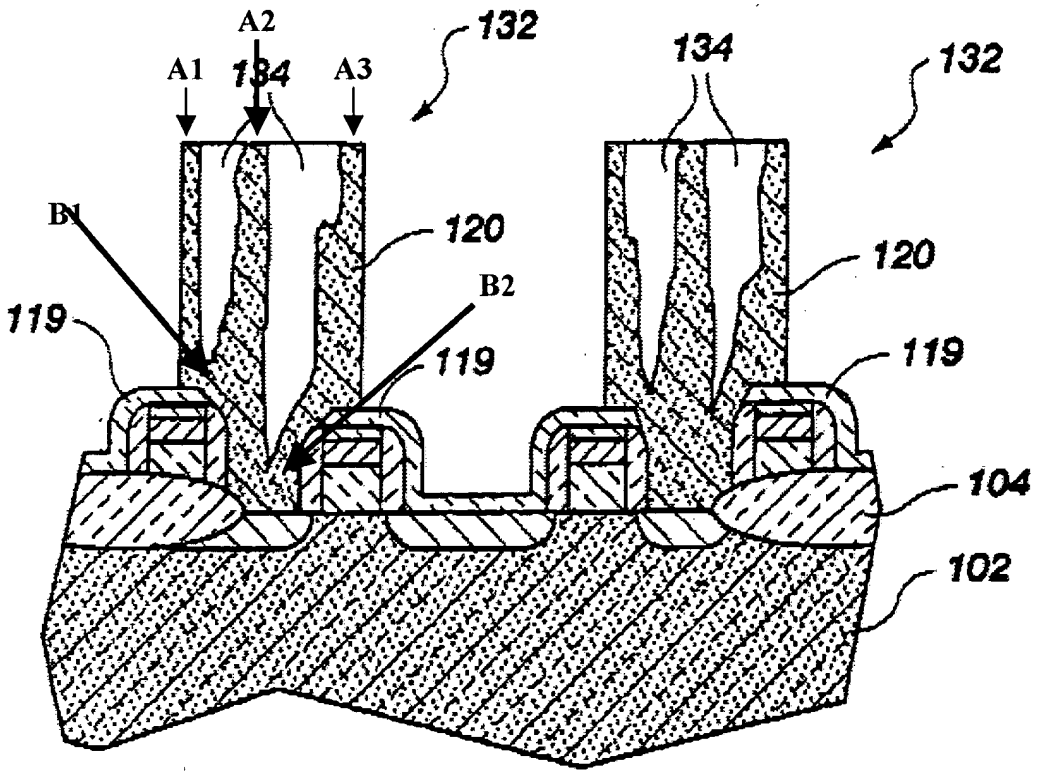


Fig. 9

Therefore, based on these interpretations it is believe that the reference Jun et al. anticipates the claimed invention.

With regards to the limitation of "forming a maze-like structure", it is noted that Jun teaches the same method that applicant rely on to form the required maze-like

structure (see page 5, lines 9-17 of Applicant's Specification). For example, Jun teaches a mask (15) deposited over a HSG polysilicon layer (14) (see fig. 4b), an uppermost portion of the HSG layer (14) exposed (see fig. 4b) and etched to formed the desired patterned structure (see fig. 4b). Thus, the structure disclosed by Jun inherently includes a maze-like structure.

As such, the rejection under 35 U.S.C. 102(b) is considered to be proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11/29/04